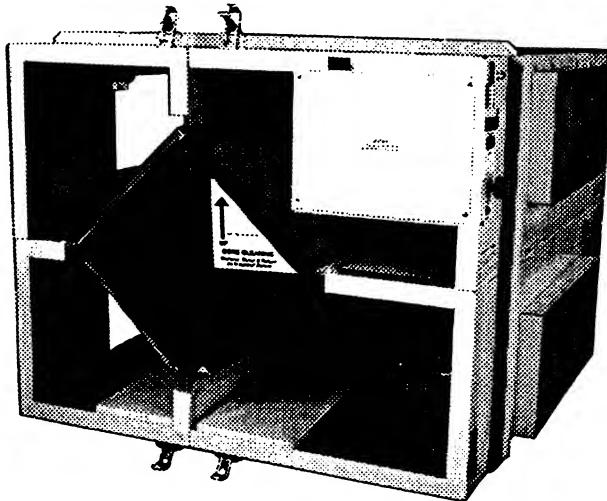


# LIFEBREATH®

## HEAT RECOVERY VENTILATORS (HRVs)

### INSTALLATION MANUAL

**Models 700FD, 700DD, 1200FD, 1200DD**  
*(Models 900FD & 900DD Discontinued)*



#### APPLICATION WARNING!!!

It is always important to assess how the operation of any Heat Recovery Ventilator may interact with vented combustion equipment (i.e., Gas Furnaces, Oil Furnaces, Wood Stoves, etc.)

**NEVER** install an Heat Recovery Ventilator in a situation where its normal operation (including defrost function), lack of operation or partial failure may result in the backdrafting or improper functioning of vented combustion equipment!!



**Do Not Attempt Installing Unit  
Without First Reading Entire Manual**

TI-72  
9312R

## INTRODUCTION

*These Heat Recovery Ventilators (HRVs) are designed for large residential, commercial and industrial applications to provide fresh air to a building while exhausting an equal amount of stale air. During the winter months the incoming cold fresh air is warmed by utilizing the heat recovered from the stale air before it is exhausted to the outdoors. During summer months when the indoor space is air conditioned, the Heat Recovery Ventilator will help in cooling the incoming fresh air with the stale air that is being exhausted.*

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**For Technical and  
Application Information  
Call  
NUTECH  
Service Dept.  
519-457-1904**

**LIFE BREATH®**  
HEAT RECOVERY VENTILATORS (HRVs)

## ENGINEERING DATA

### CORES

Engineered with aluminum for superior thermal conductivity, meets the flame spread and smoke developed classifications of the National Building Code and NFPA 90A (1993 Edition).

**MODEL 700FD, 700DD, 900FD, 900DD** - Dual Cores

**MODEL 1200FD, 1200DD** - Triple Cores

### MOTORS

Two PSC, 3 speed - Models 700 & 1200

Two PSC, 5 speed - Model 900

**MODEL 700** -single shafted, 120VAC, 2.75 Amps each-(5.50 TOTAL on HIGH speed), HP 1/5-1/8-1/10, 1625 RPM. Watts -Total high speed - 648

**MODEL 900** -double shafted, 120VAC, 3.15 Amps each-(6.3 TOTAL on HIGH speed), HP 1/0, 1625 RPM. Watts -Total high speed - 610

**MODEL 1200**-double shafted, 120VAC, 3.8-2.8-2.1 Amps-(7.60 TOTAL on HIGH speed), HP 1/4-1/5-1/6, 1625 RPM.Watts -Total high speed - 912

### FILTERS

Washable air filters in exhaust and supply air streams.

### BLOWERS

Centrifugal type

**MODEL 700** 400-700 CFM (188 - 329 L/s)

Typical Air Delivery. Each air stream has 1 single shafted motor driving 1 centrifugal blower.

**MODEL 900** 500-900 CFM (235 - 423 L/s)

Typical Air Delivery. Each air stream has 1 double shafted motor driving 2 centrifugal blowers.

**MODEL 1200** 800-1200 CFM (378 - 566L/s)

Typical Air Delivery. Each air stream has 1 double shafted motor driving 2 centrifugal blowers.

### CONNECTION DUCT SIZES

**MODELS 700 & 900**

Four (4) - 8" X 14" (200 X 356 mm)

**MODEL 1200**

Four (4) - 8" X 20" (200 X 508 mm)

### UNIT DIMENSIONS

**MODELS 700 & 900**

Length 28 3/8" (720 mm)

Width 29 5/8" (753 mm)

Height 24 5/8" (625 mm)

Weight 133 lbs. (60.45 kg)

**MODEL 1200**

Length 41 1/2" (1055 mm)

Width 29 7/8" (760 mm)

Height 24 5/8" (625 mm)

Weight 184 lbs. (83.6 kg)

### MOUNTING

Eight (8) - 10/24" (10.5 mm) threaded inserts at corners of case (2 for each support strap)  
Four (4) - Polyester reinforced PVC support straps

### CASE

20 gauge prepainted galvanized steel (G 60) for superior corrosion resistance. Insulated with a foil faced fibreglass duct liner where required to prevent exterior condensation.

### DRAIN CONNECTIONS

2 - 1/2" ( 12mm) OD connections.

### CODES and STANDARDS

CSA approved.

All components are UL listed.

### CONTROLS

- Lighted power switch
- 3 speed blower control -models 700, 1200
- 5 speed blower control -model 900
- Defrost light indicates when defrost occurs. This is automatic when outside condition drops below 23°F (-5°C)
- Low voltage (24 VAC) strip for external fan speed override to "HIGH"

## FAN DEFROST

The Models 700FD, 900FD and 1200FD are equipped with an electronically controlled fan defrost system to remove frost that collects on the warm air side of the aluminum heat transfer surfaces of the heat exchanger core. When the outside air temperature drops below 23°F (-5°C), a defrost timer is activated which provides for an automatic defrost cycle every 17 minutes. During the automatic defrost cycle the fresh air supply is shut off for approximately 4.5 minutes while the exhaust fan continues to operate. This allows warm inside air to flow over the heat exchanger core melting any frost accumulation. After the defrost period, the fresh air supply fan automatically returns to the normal speed and fresh outside air continues to be drawn into the building. Water from the melted frost collects in the bottom drip pans and drains out through the bottom drain connections. The defrost cycle repeats automatically until the air temperature rises above 23°F (-5°C).

The defrost control has a self-test feature which initiates the defrost cycle whenever the unit is started or there is a power interruption. The fan defrost operates in the defrost mode for the 4.5 minute cycle time and then returns to normal operation. The LED light indicating defrost on the control panel of the HRV is on during this period.

## DAMPER DEFROST

The Models 700DD, 900DD and 1200DD have an electronically controlled damper defrost mechanism. If the outside temperature drops below 23°F (-5°C), the defrost timer is activated. After waiting approximately 17 minutes (during which time the core may experience some nominal frost build-up), the timer activates a motor driven damper door mechanism which opens the defrost port while at the same time closing off the supply air from outside. After approximately 4.5 minutes, the damper operates in the opposite direction to close off the defrost port and reopen the fresh air at the supply port. The 17 minute wait time and 4.5 minute defrost cycle repeat until the temperature again rises above 23°F (-5°C).

The defrost mechanism incorporates an easy to "self-test" feature. Each time power to the unit is interrupted (unplugged then plugged back in or turned OFF then ON, etc.), the unit initiates a defrost cycle. The defrost L.E.D. illuminates and the damper door operates for the pre-set 4.5 minute (approximate) time interval. This allows visual inspection of the operating components involved in the defrost cycle as they perform their function.

## LOCATION for MOUNTING

The HRV must be located in a heated space where the surrounding air temperature does not fall below the freezing point. The exhaust air temperature must be above 60°F (16°C) for proper defrost operation. If the air temperature is too low the defrost time may need to be increased. The unit must be mounted

level (horizontal) to obtain proper drainage of water from the heat exchange cores and drip pans. The warranty will be void if these conditions are not met.

Typically, the HRV is positioned close to an outside wall or the roof to simplify the connections and keep the length of insulated ducting required for the fresh air intake to a minimum. The fresh air inlet may either be at the top for a roof inlet or at the end for a wall connection on a DD model (field modification).

A minimum clearance of 36 in. (90 cm) in front of the HRV is recommended to service the heat exchanger cores and the filters. The four polyester reinforced PVC straps supplied are intended to be used to hang the HRV from floor or ceiling joists. The straps should be attached to the top end corners of the HRV case. Securely fasten the other end of the straps with large head screws or bolts. The straps are designed to reduce the possibility of any fan vibration being transmitted to the floor joists or alternately preventing any vibration in the floor from being transmitted to the ducting. The HRV may also be mounted on an equipment platform providing the drain hoses are clear and there is sufficient space to open the doors for servicing.

Install the drain pans in the bottom of the HRV so the drain connections protrude through the holes provided. See Figure #1 for location of the drain pans and the drain connections. Inverting the T connection will form a trap in the drain. Use drain hoses with hose clamps to connect the drain pan outlets to a floor drain or standpipe. Make sure the drain line slopes down to the outlet and if this is not possible a condensate pump will be required for positive removal of the water. Protect the drain line from freezing.

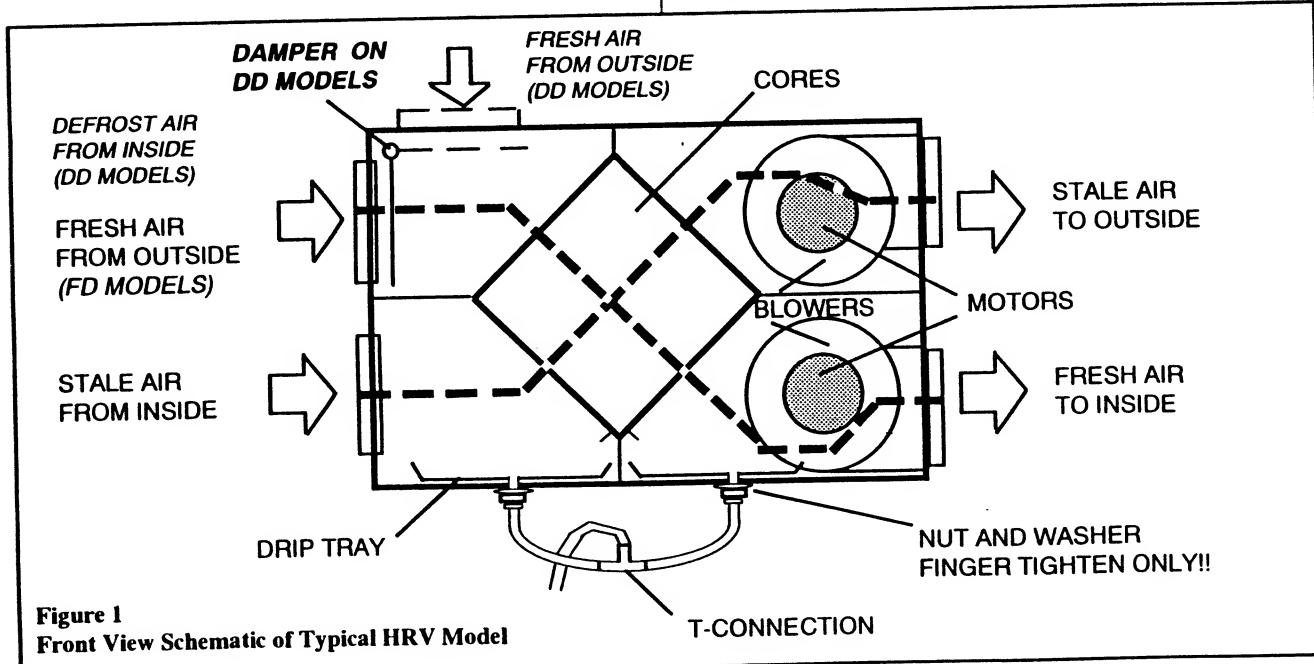


Figure 1  
Front View Schematic of Typical HRV Model

## THE DUCTWORK SYSTEM

A well designed ducting system will allow the HRV to operate at its maximum efficiency. Avoid the use of undersized ducting and sharp radius bends and tees which can significantly increase the system pressure drop and reduce the air flows.

**NOTE:** *Fully insulated ducting with an integral vapour barrier must be used on all runs passing through unheated areas in order to avoid condensation problems and energy losses from the air streams.*

The four ports on the Model 700 AND 900 are designed to accept 8" X 14" (200 X 356 mm) and the Model 1200, 8" X 20" (200 X 508 mm) hard duct for attachment to the ductwork system.

To minimize pressure drop and noise, galvanized metal ducts sized for 1200 fpm (6.09 m/s). (maximum velocity) are recommended. Keep ducting as short as possible and use a minimum of elbows and tees. Connecting sections and shorter runs may be flexible ducting one size larger than the metal duct. Use flexible duct connectors at the HRV to avoid noise transmission.

All duct joints must be secured with screws, rivets or duct sealant and sealed with aluminum duct tape to prevent leakage.

### A OUTSIDE WEATHERHOODS

The weatherhoods must have built-in "bird" screens with 1/4 in. (.635 cm) minimum mesh to prevent foreign objects from entering into the ductwork. Do not use smaller mesh as it will be very susceptible to plugging up. Flappers and dampers at the vents must not be used as they will restrict air flow and often "seize up". The preferred location of the outside weatherhoods is:

- no less than 10 ft. (3 m) apart from each other
- at least 18 in. (46 cm) above ground level
- away from sources of contaminants, such as automobile exhaust fumes, gas meters, garbage containers, etc.
- not exposed to prevailing winds, whenever reasonably possible

The outside perimeter of the weatherhood must be caulked to prevent leakage into the building.

The design and size of the weatherhoods or louvers chosen by the installer must allow for adequate free area. Water and snow penetration of the system is minimized when the airflow does not exceed 750 FPM (3.81m/s) free area velocity.

### B

## DUCTING from the WEATHERHOODS

Galvanized sheet metal ducting with sufficient cross section with an integral single piece vapour barrier should be used to connect the HRV to the weatherhoods. **All ducting must meet ULC Class 1 Fire Rating.**

A minimum R value of insulation should be equal to 4 (RSI 0.75).

A good bead of high quality caulking (preferably acoustical sealant) and taping with a high quality aluminum foil tape is recommended to seal the duct to both the HRV and the weatherhood.

### WARM SIDE DUCTING - General

Ducting from the HRV to different areas within the building should be galvanized metal whenever possible.

To minimize airflow losses in the ductwork system, all ducts should be as short as possible and with as few bends or elbows as possible. 45° elbows are preferred to 90° elbows, whenever possible. Use Y tees instead of 90° tees whenever possible.

All duct joints must be fastened with screws, rivets or duct sealant and wrapped with a quality duct tape to prevent leakage. We recommend aluminum foil tape.

## STALE AIR RETURN SYSTEM

The stale air return system is used to draw air from the points in the building where the worst air quality problems occur. Balancing dampers and/or adjustable grilles are recommended on all return air lines which are used during installation to help balance the "draw" from different areas of the building. Note that the installation schematics show balancing dampers and/or adjustable grilles on all return air lines coming back to the unit. These are installed to help balance the "draw" from the different areas of the building.

Alternately, the stale air may be drawn directly from the return air duct. When this system is used the air handler's blower will constantly operate. The exhaust takeoff connection must be at least a meter from a directly connected HRV supply duct if both are connected to the same duct run.

A damper located just prior to the HRV is required to balance the stale air exhausted with the fresh air supply entering the building.

Return air suction points should be located at the opposite side of the room to the fresh air inlet. The inlets may be located in the ceiling or high on the walls and fitted with inlet grilles.

In residential applications the gypsum and studs of the wall can be used as a "duct" for high wall returns. When using wall cavities this way, they should be lined with either galvanized sheet metal or polyethylene (check Local Codes). The wall plate and the floor ply must be cut out to accept either ducting or the proper sized sheet metal boot.

Many commercial activities produce air contaminants in the form of dusts, fumes, mists, vapours and gases. Contaminants should be controlled at the source so that they are not dispersed through the building nor allowed to increase to toxic concentration levels. The heat recovery ventilator allows for economical operation of the HVAC system while effectively removing contaminants from the space. In designing the exhaust portion of the system the exhaust grilles are placed so as to remove the contaminants while not allowing them to enter the breathing zone of the occupants.

For contaminants that are lighter than air, grilles should be located high on the wall. If contaminants are heavier than air, a lower placement of the grilles will be required. Information on a contaminants specific gravity and toxicity should be available from the chemical data sheets.

## FRESH AIR SUPPLY SYSTEM

The fresh air supply ductwork from the HRV may be directly connected to the return air duct of the forced air system. When directly connected it is recommended that the air handler blower be in constant operation to move the fresh air about the building. Also, it is advisable to include a short length of fabric flex duct or other non-metallic connector in this hard ducted line in order to keep the HRV acoustically isolated and separately grounded (electrically) from the air handler. This will avoid a possible shock hazard to Service People if a short to ground develops in one of the devices.

It may be necessary to install a separate fresh air supply ductwork system if the heating is other than forced air.

When installing an HRV, the designer and installer should be aware of local codes that may require smoke detectors and / or firestats in the HVAC or HRV ductwork. Because an HRV is designed to bring fresh air into the building, structures may require a supply voltage interrupt when smoke or flame sensors are triggered or central fire alarm system is activated.

Supply air grilles may be ceiling or high wall mounted. Avoid locating incoming fresh air grilles that could cause a direct draft on the occupants as the incoming air may be below room temperature. A reheat duct heater can be installed to improve occupant comfort.

The use of balancing dampers or adjustable grilles as supply air diffusers and air exhaust grilles are recommended. TECHGRILLES™ (from NUTECH) are round, efficient, sound absorbing devices available in 4", 5", 6" (100, 125 and 150 mm).

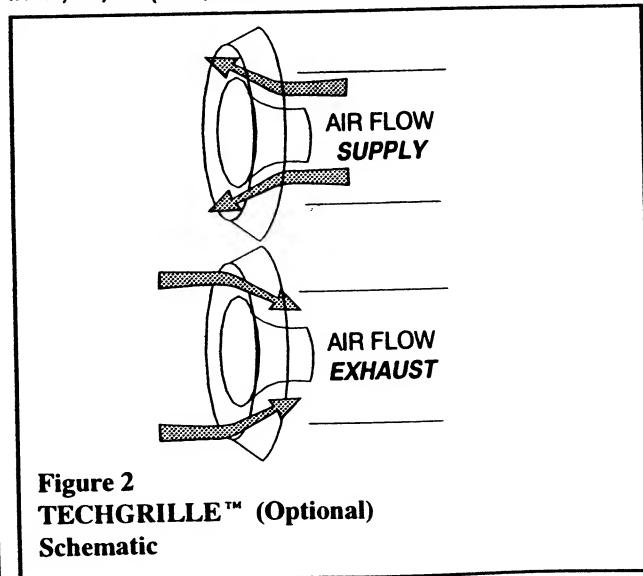


Figure 2  
TECHGRILLE™ (Optional)  
Schematic

## THE INTEGRATED HVAC SYSTEM

The HRV has become an integral component of the HVAC system. Figure 4A shows an HRV unit providing fresh air directly to the return air plenum of a Rooftop heat/cool unit.

An economizer if installed on the air handler may be used to provide first stage free cooling, but the outside air damper is to be set at its minimum opening or 0° position. In the balanced airflow system, the HRV exhaust removes stale room air (eg. from lunch room, storage or copy area) and returns to the space an equal amount of fresh outdoor air.

Many buildings have a ceiling return air plenum as in Figure 4B. Fresh air from the HRV can be introduced directly into the ceiling space but this should occur near the air handler's intake.

By operating the HRV on a 24 hour/7 day battery backed timer the unit can be set to operate only when occupancy or indoor conditions require the air exchange.

In installations where it is satisfactory to provide general exhaust from the space, the air to be exhausted may be taken directly from the return air plenum to the HRV as it is drawn back to the air handler. Fresh air supplied by the HRV is then introduced directly into the return air plenum but at a location closer to the air handler. The air handler would have a constant running blower to effectively distribute the fresh air and remove the stale air. Balancing dampers would be located in both the HRV supply and exhaust ducts between the return air plenum and the HRV.

## ELECTRICAL CONNECTIONS

It is recommended that a licensed electrician make all electrical connections. It is very important that the unit be properly grounded. It is recommended that a separate 15 amp/120 volt circuit be used.

**WARNING:** *In order to prevent electric shock when cleaning or servicing the HRV, it is extremely important to confirm the polarity of the power line that is switched by the safety (disconnect) switch whose control arm is located on the outside electrical control box area. The hot line (black) is the proper line to be switched. To confirm the proper polarity, use a voltmeter or test lamp to make sure there is no power after the switch when the door is open. Check between that point and ground (on the cabinet). This must be done as occasionally some buildings are improperly wired. Always make sure the HRV is properly grounded.*

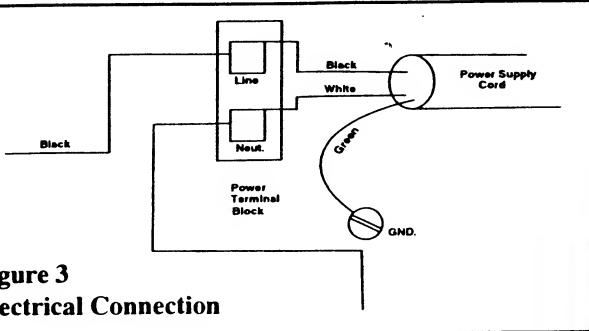


Figure 3  
Electrical Connection

## AIR FLOW BALANCING

It is necessary to have volume balanced air flows in an HRV. The volume of air brought in from the outside must equal the volume of air exhausted by the HRV. If the air flows are not properly balanced, then;

- *The HRV may not operate at its maximum efficiency*
- *A negative or positive air pressure may occur in the building*
- *The HRV may not defrost properly.*
- *Failure to balance HRV may void warranty*

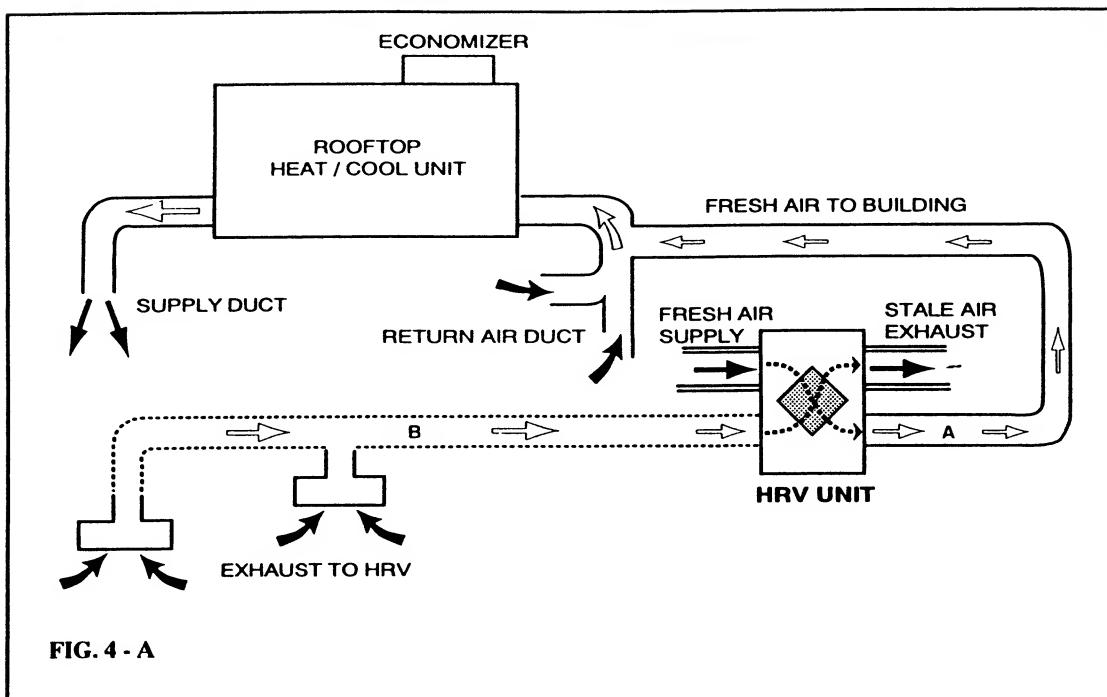
**An excessive positive pressure** may drive moist indoor air into the external walls of the building where it may condense (in cold weather) and degrade structural components.

**An excessive negative pressure** may have several undesirable side effects. In some geographic locations, soil gases such as radon and methane may be drawn into the building through basement/ground contact areas. Radon is currently believed to be a serious medical concern. As well, an excessive negative pressure may cause the backdrafting of vented combustion equipment if an adequate combustion air supply is not provided. **Read the Application Warning at the start of this manual!**

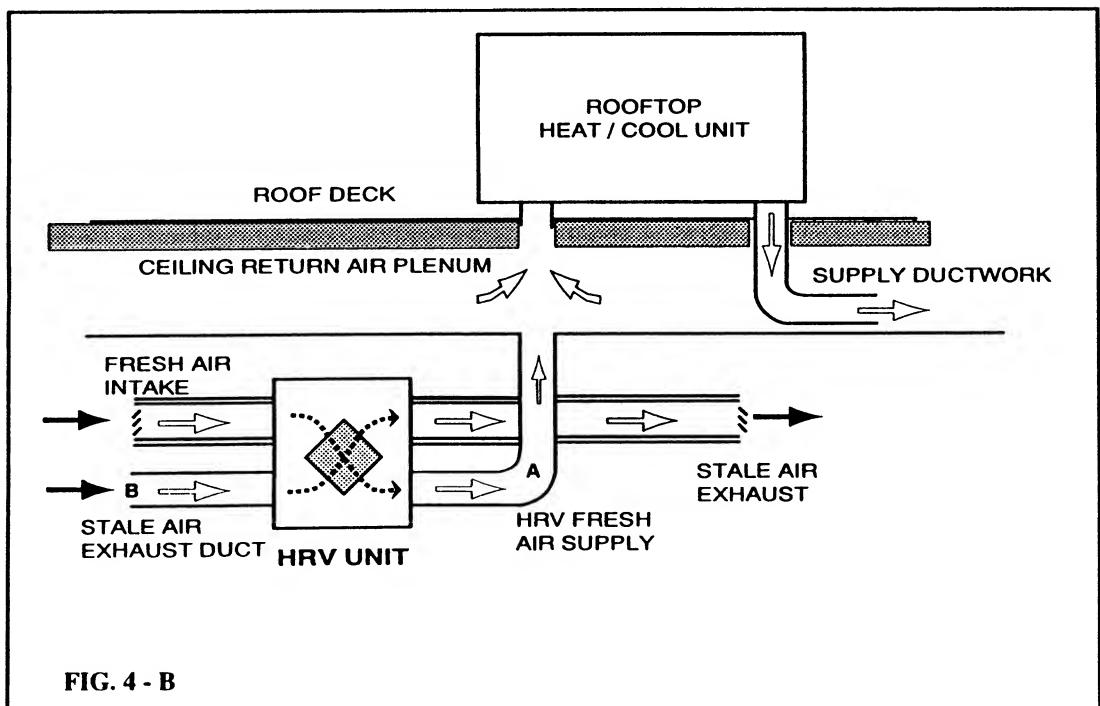
### Procedure:

- A. To balance the air flows requires an accurate flow measure of the fresh entering air and the exhaust stale air. The air flows can be measured with a calibrated measuring instrument such as a flow orifice or by measuring the air velocity across the duct with a pitot tube or hot wire anemometer. The flow measurements should be made in a straight section 10 duct diameters from an elbow or restriction.
- B. Prior to balancing, make sure:
  1. All sealing of the ductwork system has been completed.
  2. All of the HRV components are in place and functioning properly.
  3. Balancing dampers are fully open.
  4. Unit is on HIGH speed.
  5. If directly connected to a furnace or air handler, have that units blower on before balancing the HRV.
  6. Air flows in branch lines to specific areas of the building should be adjusted first prior to balancing the unit. A smoke pencil used at the grilles is a good indicator of each branch line's relative air flow.
  7. After taking readings of both the stale air to the HRV duct and the fresh air to the building duct, the duct with the lower CFM (L/s) (velocity) reading should be left alone, while the duct with the higher reading should be dampered back to match the lower reading.
  8. Return unit to appropriate fan speed for normal operation.

## THE INTEGRATED HVAC SYSTEM



**FIG. 4 - A**



**FIG. 4 - B**

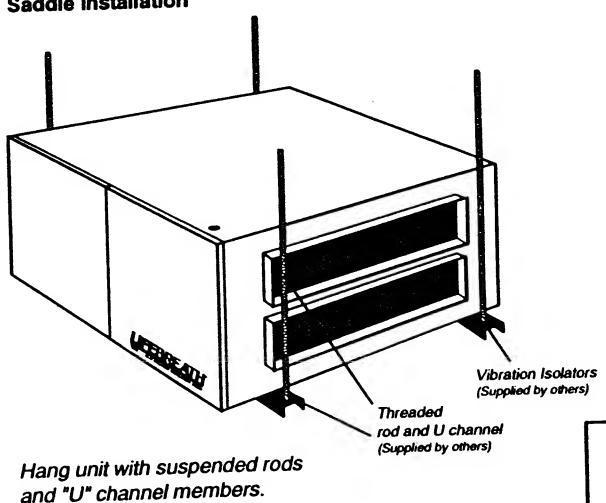
### **BALANCING DAMPERS**

**A - Fresh Air Supply**

**B - Stale Air Exhaust**

## VARIOUS INSTALLATION TYPES

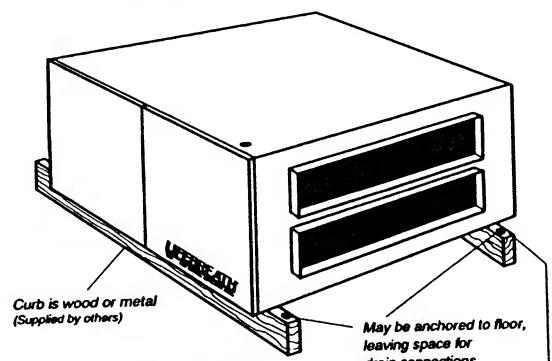
**FIG. 5-A**  
Saddle Installation



Hang unit with suspended rods  
and "U" channel members.

**\* NOTE:** When installing your LIFE BREATH® HRV, flexible duct connectors should be installed between the HRV and the galvanized ductwork.

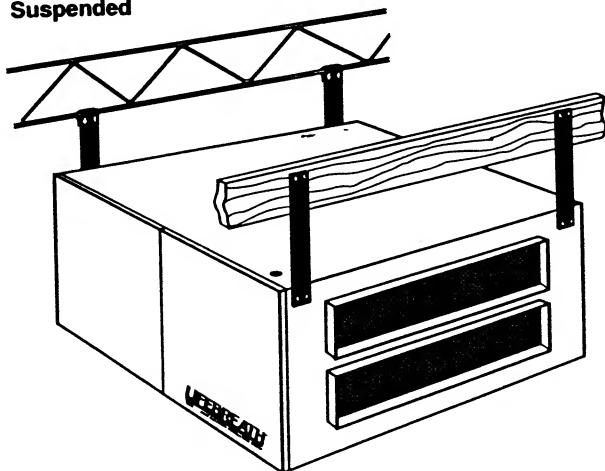
**FIG. 5-B**  
Curb Mounted



Mount unit on wooden or metal  
curb assembly. Unit must be raised  
an adequate height for installation and slope  
of drain lines.

Vibration Isolators  
(Supplied by others)

**FIG. 5-C**  
Suspended



Unit Suspended using  
Polyester reinforced PVC support straps.

## SPECIFICATIONS

### CORES

Modular (2 section) patented aluminum heat recovery cores arranged for efficient cross-flow ventilation.

### MOTORS

Two PSC, 3 speed single shafted, 120 VAC, 2.75 Amps each (5.5 total on high speed). HP - 1/10, 1625 RPM. Watts - total on high speed - 648.

### FILTERS

Washable air filters in exhaust and supply air streams.

### BLOWERS

Centrifugal type rated at 329 L/s (700 CFM) free air delivery. Each air stream has one single shafted motor driving a centrifugal blower.

### CONNECTION DUCT SIZES

Four - 356 mm x 200 mm H (14" x 8" H).

### MOUNTING

Unit to be set on support brackets hung by threaded rod type apparatus (brackets and rods not provided).

### CASE

20 gauge prepainted galvanized steel (G60) for superior corrosion resistance. Insulated with foil faced insulation where required to prevent exterior condensation. Drain connections; two - 12 mm (1/2") O.D.

### CONTROLS

Illuminated power switch, 3 speed blower control, low voltage (24 VAC) terminals for connection of remote controls and defrost light indicating automatic operation.

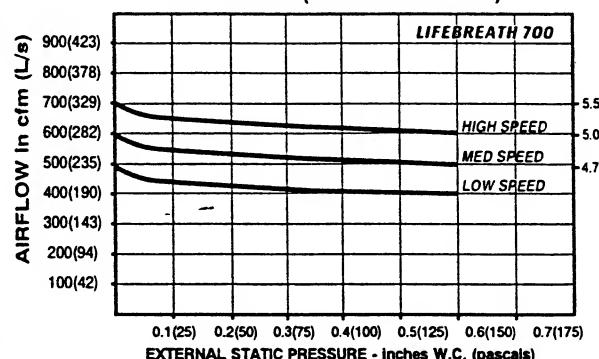
### DEFROST CONTROLS

MODEL 700 FD - Interrupts supply air while exhaust air defrosts core.  
MODEL 700 DD - Supply bypass routes indoor air to defrost core.

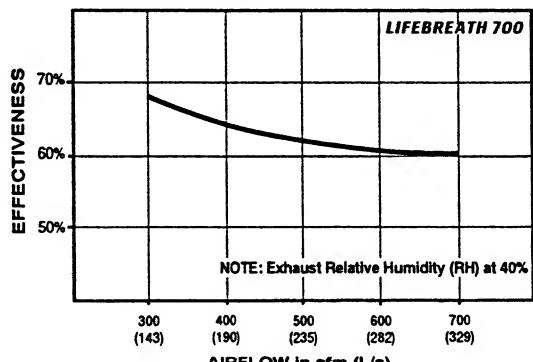
**WEIGHT** 64.4 kg (142 lbs.) **SHIPPING WEIGHT** 75.8 kg (167 lbs.)

## PERFORMANCE

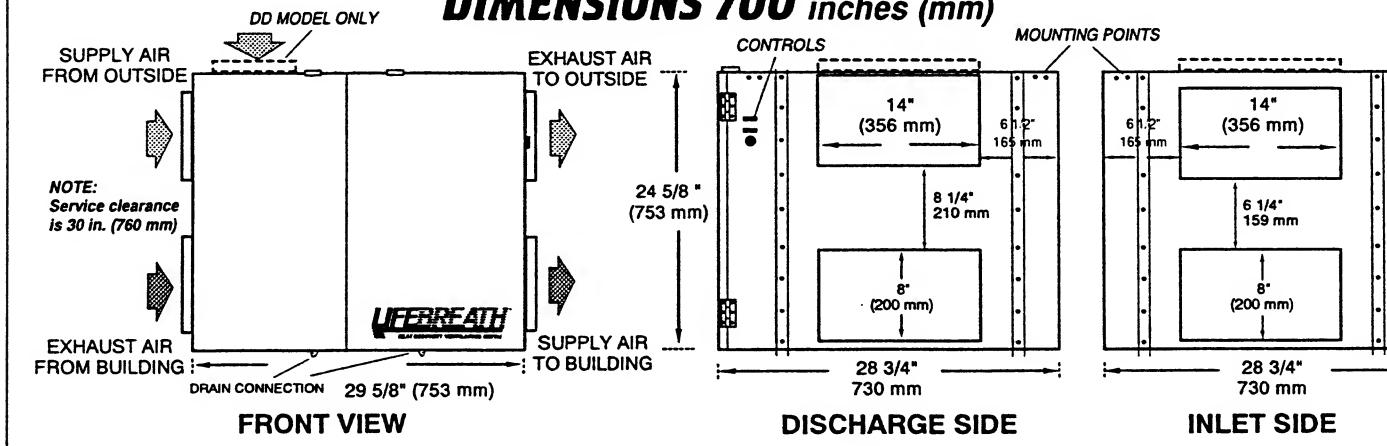
### AIRFLOWS (Each Air Stream)



### TEMPERATURE EFFECTIVENESS



## DIMENSIONS 700 inches (mm)



All units conform to CSA and UL standards.

### WARRANTY

Units carry a 15 year warranty on the heat recovery cores and a 2 year replacement parts warranty.

DATE: \_\_\_\_\_

PROJECT: \_\_\_\_\_

MECHANICAL CONTRACTOR: \_\_\_\_\_

## SPECIFICATIONS

### CORES

Modular (3 section) patented aluminum heat recovery cores arranged for efficient cross-flow ventilation.

### MOTORS

Two PSC, 3 speed double shafted, 120 VAC, 4 Amps each (8.1 total on high speed). HP - 1/4, 1625 RPM. Watts - total on high speed - 972.

### FILTERS

Washable air filters in exhaust and supply air streams.

### BLOWERS

Centrifugal type rated at 1200 cfm (566 L/s) free air delivery. Each air stream has one double shafted motor driving a centrifugal blower.

### CONNECTION DUCT SIZES

Four - 20" x 8" H (508 mm x 200 mm H).

### MOUNTING

Unit to be set on support brackets hung by threaded rod type apparatus. (brackets and rod not provided).

### CASE

20 gauge prepainted galvanized steel (G60) for superior corrosion resistance. Insulated with foil faced insulation where required to prevent exterior condensation. Drain connections; two - 1/2" (12 mm) O.D.

### CONTROLS

Illuminated power switch, 3 speed blower control, low voltage (24 VAC) terminals for connection of remote controls and defrost light indicating automatic operation.

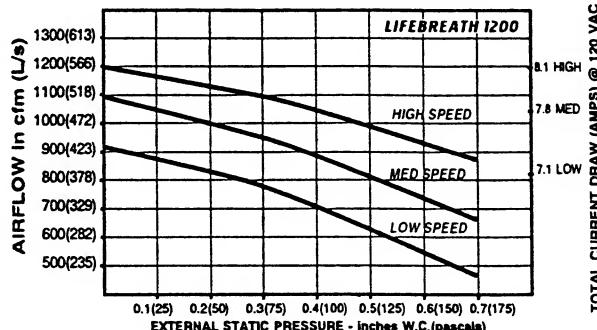
### DEFROST CONTROLS

MODEL 1200 FD - Interrupts supply air while exhaust air defrosts core.  
MODEL 1200 DD - Supply bypass routes indoor air to defrost core.

**WEIGHT** 191 lbs. (87 kg) **SHIPPING WEIGHT** 215 lbs. (98 kg)

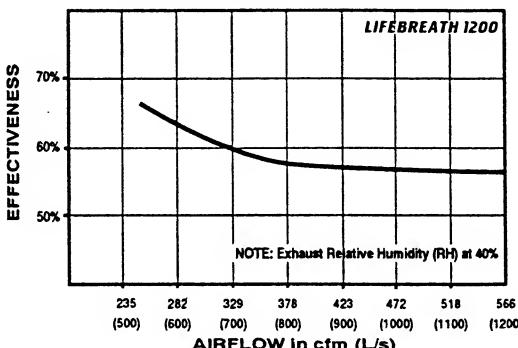
## PERFORMANCE

### AIRFLOWS (Each Air Stream)



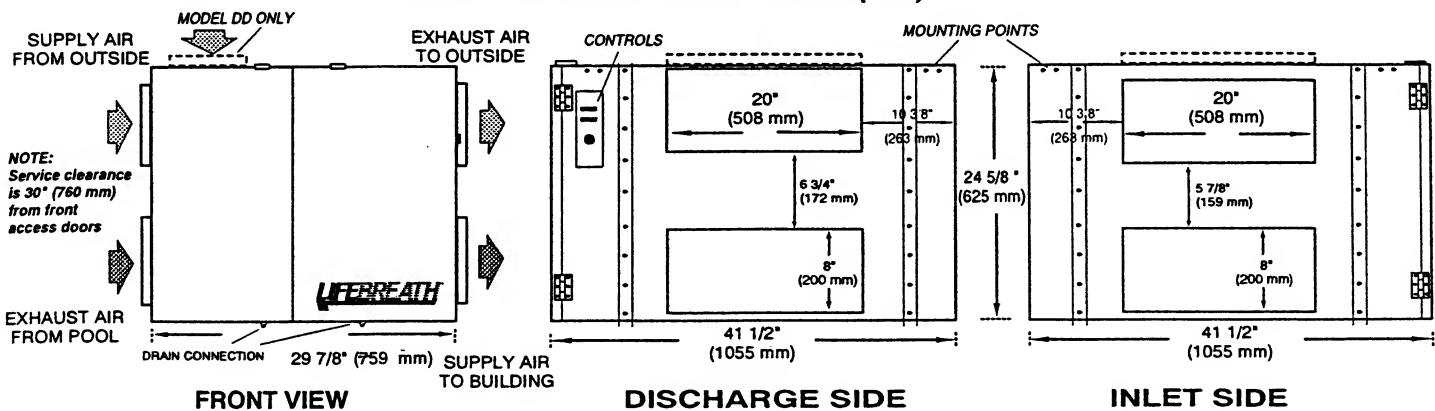
TOTAL CURRENT DRAW (AMPS) @ 120 VAC

### TEMPERATURE EFFECTIVENESS



NOTE: Exhaust Relative Humidity (RH) at 40%

## DIMENSIONS 1200 inches (mm)



## OPTIONS

99-101 Sixty Minute Remote Timer

All units conform to CSA and UL standards.

99-130 Remote Wall Mount Dehumidistat Control  
24 VAC only, W (white) or B (beige)

### WARRANTY

Units carry a 15 year warranty on the heat recovery cores and a 2 year replacement parts warranty.

DATE: \_\_\_\_\_ UNIT SELECTED: \_\_\_\_\_

PROJECT: \_\_\_\_\_

MECHANICAL CONTRACTOR: \_\_\_\_\_

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